

REMARKS

5 The Office Action dated 14 June 2005 indicates claims 1-20 are pending: claims
1-4, 6-15, and 18-20 are rejected and claims 5, 16, and 17 are objected to. More
specifically, the Office Action indicates that claims 1-4, 6-15 and 18-20 are rejected
under 35 USC 102(b) as being anticipated by Amazeen et al. (US Patent 4,745,812).
The Office Action further indicates that claims 5, 16, and 17 would be allowable if
10 rewritten in independent form including all the limitations of the base claim and any
intervening claims.

Applicant gratefully acknowledges the Examiner's finding of claims 5, 16, and 17
having allowable subject matter.

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Allowable Subject Matter

16 Applicant respectfully request withdrawal of the objections to claims 5, 16, and 17
20 in view of the amendments to claims 5, 16, and 17 making them independent
claims including all of the limitations of the base claim and any intervening
claims as required in the Office Action dated 14 June 2005.

25 The Office Action states that "Claims 5, 16 and 17 are objected to as being
dependent upon a rejected base claim, but would be allowable if rewritten in
independent" In response to the Office Action, Applicant has amended claims 5, 16,
and 17 so that they are now independent claims showing all of the limitations of the
originally filed dependent claims 5, 16, and 17, respectively. The amendment of claims
5, 16, and 17 is done without prejudice to Applicant's rights to further prosecute the
30 originally submitted claims and any related dependent claims in a continuation,
continuation in part, and/or request for continued examination.

In view of the amendments to claims 5, 16, and 17, it is Applicant's belief that amended independent claims 5, 16, and 17 are allowable. Applicant further requests consideration and allowance of new dependent claims 21-38 which all depend from allowable independent claim 5 and add further description and/or limitation(s) to independent claim 5.

Claim Rejections – 35 USC 102(b)

Amazeen et al. (US Patent 4,745,812) does not anticipate Applicant's claims 3 and 18-20 under 35 U.S.C. 102(b). Dependent claim 3 has been rewritten into independent claim 3. Independent claim 3 and originally submitted claims 18-20 all recite structure and/or details that are not taught by Amazeen et al. Applicant respectfully requests withdrawal of the rejection of claims 3 and 18-20 under 35 U.S.C. 102(b) as being anticipated by Amazeen et al. (US Patent 4,745,812).

The Office Action states:

"Amazeen discloses a process tolerant sensor apparatus comprising: a bottom substrate (fig. 8, unit 18); b) a top substrate (fig. 8, unit 12, 20); c) a plurality of sensors disposed between the bottom substrate and the top substrate (Col. 5-6, Lines 6-2); d) a plurality of electrically conductive interconnects disposed between the bottom substrate and the top substrate (Col. 5-6, Lines 6-2); e) electrically active components connected to the conductive interconnects for at least one of data acquisition, data storage, and communications; and bonding material substantially filling the volume between the bottom substrate and the top substrate (Col. 6-7, Lines 3-32)."

Applicant believes that the statement in the Office Action that describes "a top substrate (fig. 8, unit 12, 20)" is inaccurate. The accurate interpretation of the Amazeen et al. apparatus is that the top substrate corresponds to unit 20 and the sensors correspond to unit 12 in Fig. 8 of Amazeen et al.

Amazeen et al. do not teach the apparatus taught by Applicant. This will be seen upon a more thorough review of the teachings of Amazeen et al. Amazeen et al. teach using a silicon wafer to fabricate the main body member 12 in making an array style

tactile sensor 10 comprised of a plurality of silicon bossed diaphragm elements or tactile structures 16 (see column 5, lines 21-23). Amazeen et al. further state that "each of these diaphragmed tactile elements 16 collectively with its accompanying circuitry ... serves as a transducer element TD to comprise the ... multitransducer cell sensor device" (see column 5, lines 34-38). Again in column 5, lines 60-65, Amazeen et al. teach that the sensor is fabricated in the silicon wafer (column 5, lines 60-65). Amazeen et al. say that the plural tactile elements 16 may be supported on a supporting member 18. In column 6, lines 63-65, Amazeen also teaches that "there is fixedly attached to the upper surface of the sensor array a polymer cover layer 20 (FIG. 8) which protects the entire upper sensor surface area."

Applicant's interpretation of the teachings of Amazeen et al. is that Amazeen et al. teach a supporting member 18, a plurality of tactile structures 16 fabricated out of main body member 12, and a polymer cover layer 20. The main body member 12 is disposed between the supporting member 18 and the polymer cover layer 20. The tactile structures 16 are connected with a diaphragm to allow deflection of the tactile structures 16 (see column 6, lines 34-44). The cover layer 20 is described as a flexible polymer type protective cover layer 20 in Amazeen et al. claims 4 and 14. In fact, the apparatus taught by Amazeen et al. appears to specifically require that the top protective substrate be flexible so as to allow the diaphragms to deform (see column 7, lines 5-13).

In regard to Applicant's claims 18-20, Amazeen et al. only teach the use of a polymer as the top substrate, as explained in Applicant's remarks above. Amazeen et al. never teach using a semiconductor wafer for the top as taught by Applicant and recited in Applicant's independent claim 18. More specifically, Amazeen et al. never teach the combination of a bottom semiconductor wafer, a top semiconductor wafer, and a plurality of sensors disposed between the bottom semiconductor wafer and the top semiconductor wafer. Amazeen et al. teach having a bottom semiconductor wafer (Amazeen et al.'s supporting member 18), supporting sensors (Amazeen et al.'s tactile

elements 16 collectively with its accompanying circuitry), and either without a protective layer or with a protective layer (Amazeen et al.'s polymer cover layer 20).

Furthermore, Applicant's claim 18 further recites an electronics module
5 comprising a housing containing electrically active components. Detailed embodiments of Applicant's invention showing the electronics module are presented in Applicant's originally filed application such as in Fig. 11 and Fig. 16. In contrast, Amazeen et al. teach no corresponding structure of an electronics module or of a housing as taught by Applicant. It is reasonable to believe that having a housing as taught by Applicant,
10 particularly such as that shown in Fig. 11 of Applicant's application, would interfere with the operation of Amazeen et al.'s tactile sensor because the electronics module extends above the top surface of the apparatus.

Regarding Applicant's claim 3, the Office Action incorrectly identifies the sensors
15 of Amazeen et al. as being equivalent to Applicant's top substrate. Whereas, Applicant's claim 3 recites a top substrate comprising a semiconductor wafer, a bottom substrate, and a plurality of sensors between the top substrate and the bottom substrate. Applicant's apparatus distinguishes over the teachings of Amazeen et al. in a variety of ways, one of which being that Amazeen et al. only teach a cover layer 20 as a flexible polymer type protective cover layer or Amazeen teaches not to use a cover layer. It is further shown in the remarks above that a cover layer comprising a semiconductor wafer instead of a flexible polymer type protective layer would not be suitable for use in the apparatus taught by Amazeen et al.

25 Regarding Applicant's claim 4, the Office Action appears to indicate that "Amazeen discloses top substrate is quartz (Col. 5, lines 36-41)." However, Applicant has not been able to find the word "quartz" anywhere in the Amazeen et al. patent. Furthermore, the use of a quartz top substrate as taught by Applicant is not supported by the teachings of Amazeen et al., as shown in the remarks presented above.

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Regarding Applicant's claim 7, the Office Action states that "Amazeen discloses RF shielding material (Col. 5-6, Lines 60-2)." The Office Action misinterpreted the teachings of Amazeen et al. With respect to shielding, Amazeen et al. only teach using a coating to chemically protect conductive strips during the chemical etching fabrication steps for making the device. In other words, Amazeen et al. teach a chemical masking step for fabrication that involves using a coating such as a layer of black wax. Amazeen et al. do not teach using RF shielding material as recited in Applicant's claim 7. Furthermore, Amazeen et al. only teach using shielding for the fabrication process; Amazeen et al. do not teach including the shielding with the final apparatus.

Regarding Applicant's claims 8 and 15, the Office Action states that "Amazeen discloses shield electrically conductive layer (Col. 5-6, Lines 60-2)." The Office Action misinterpreted the teachings of Amazeen et al. With respect to shielding, Amazeen et al. only teach using a coating to chemically protect conductive strips during the chemical etching fabrication steps for making the device. In other words, Amazeen et al. teach a chemical masking step for fabrication that involves using a coating such as a layer of black wax. Amazeen et al. do not teach using RF shielding material as recited in Applicant's claim 8 and 15. Applicant has found nothing in the teachings of Amazeen et al. relating to radio frequency shielding.

Regarding Applicant's claim 9, the Office Action states that "Amazeen discloses shielding efficiency over predetermined frequency range (Col. 5-6, Lines 60-2)." The Office Action misinterpreted the teachings of Amazeen. With respect to shielding, Amazeen et al. only teach using a coating to chemically protect conductive strips during the chemical etching fabrication steps for making the device. Amazeen et al. do not teach anything regarding shielding efficiency or frequency range; Amazeen et al. teach nothing about radio frequency shielding.

Regarding Applicant's claim 10, the Office Action states that "Amazeen discloses at least one of the bottom substrate and the top substrate is thinned so that the thickness of the sensor apparatus substantially equals the thickness of a predetermined

workpiece (fig. 8, unit 12, 18)." As presented in the remarks made above, the Office Action incorrectly identifies Amazeen et al.'s unit 12 as being the same as Applicant's top substrate. In reality, unit 12 corresponds to the sensors recited in Applicant's claim 10. Amazeen et al. teach thinning at least part of unit 12 in order to form the diaphragm structures needed for the tactile sensors taught by Amazeen et al. Furthermore, Amazeen et al. teach nothing about a predetermined substrate as taught by Applicant. Applicant teaches a predetermined substrate because of the intended use of Applicant's apparatus. More specifically Applicant teaches a sensor apparatus for measuring process conditions experienced by a workpiece during the processing of that workpiece. Preferred embodiments of Applicant's apparatus are configured so as to have dimensions that are substantially the same as those or that are as close as possible to the dimensions of the workpiece. Examples of the workpiece for which embodiments of the present invention are suitable are semiconductor wafers, lithography masks, and flat panel display substrates. Amazeen et al. provide no teachings regarding the dimensions of a workpiece; nor do they specify any relation between the dimensions of the workpiece and the dimensions of the sensor apparatus.

Regarding Applicant's claim 11, the Office Action states that "Amazeen discloses the plurality of sensors and electrically conductive interconnects are disposed upon the surface of the bottom substrate, a mirror image pattern of the sensors and interconnects is disposed upon the surface of the top substrate, and wherein the mirror image pattern and the sensors are of substantially the same thickness (Fig. 8, unit 12, 18)." In Applicant's remarks made above, it was shown that unit 12, as taught by Amazeen et al., corresponds to sensors and is not analogous to Applicant's top substrate. This means that the analysis presented in the Office Action regarding claim 12 is inappropriate. Furthermore, Amazeen et al. never teach having a mirror image pattern thickness equal to the thickness of the sensors and interconnects; the mirror image pattern of equal thickness for the sensors and interconnects is not shown in Fig. 8 of Amazeen et al.

Regarding Applicant's claim 12, the Office Action states that "Amazeen discloses at least one of the electrically active components is disposed upon the surface of the bottom substrate, the top substrate has a hole, and the at least one of the electrically active components extends into the hole in the planar top substrate (fig. 8, unit 12 and 18)." Fig. 8 in Amazeen et al. does not teach extending any of the active components into holes in the top substrate. Amazeen et al. appear to teach texturing of the top element (unit 20) to enhance the operation of the tactile sensor elements.

Regarding Applicant's claims 13 and 14, the Office Action states that "Amazeen discloses the bottom substrate is electrically isolated from the top substrate (column 5, lines 46-59); regarding claim 14, Amazeen discloses the bottom substrate is electrically connected to the top substrate column 5, lines 46-59." In remarks presented above, Applicant showed that the Office Action incorrectly identifies unit 12 taught by Amazeen et al. as being equivalent to Applicant's top substrate. In reality, the closest equivalent to Applicant's top substrate is unit 20 taught by Amazeen et al. Amazeen et al. provide no teachings about the electrical contact between units 12 and 18 shown in Fig. 8.

Regarding Applicant's claims 19 and 20, see Applicant's remarks made above. In addition, Applicant's claim 19 recites an electronics module having a housing. Amazeen et al. do not teach a housing for the electronics module and teach nothing about having the electronics module disposed between the top substrate and bottom substrate, as taught for some embodiments of Applicant's invention. Nor do Amazeen et al. teach anything about having the electronics module extending through the top substrate. Again, Applicant respectfully points out that the Office Action inappropriately associates Applicant's top substrate with the Amazeen et al. sensors.

Claims 1-2, 4, and 6-15 have been canceled without prejudice; Applicant reserves the right to continue prosecuting these canceled claims in one or more qualifying applications such as continuation, continuation in part, and request for continued examination. Claim 3 is amended without prejudice to Applicant's rights to further prosecute the originally submitted claims and any related dependent claims in a continuation, continuation in part, and/or request for continued examination.

Conclusions

Applicant has amended claims 5, 16, and 17 so that they are now independent claims showing all of the limitations of the originally filed dependent claims 5, 16, and 17, respectively. Amended claims 5, 16, and 17 now meet the requirements as set forth in the Office Action dated 14 June 2005 and are now allowable. New dependent claims 21-38 are allowable because they depend from allowable independent claim 5 and add further description and/or limitations to independent claim 5.

In the remarks presented above, Applicant has shown that independent claims 3 and 18 describe embodiments of Applicant's invention that are not taught nor suggested by Amazeen et al. As such, withdrawal of the rejection of independent claims 3 and 18 under 35 U.S.C. 102 is respectfully requested. Upon withdrawal of the rejections of independent claims 3 and 18, Applicant respectfully requests allowance of dependent claims 19-20, as they depend from allowable independent claim 18 and add further limitations and/or further description.

In view of the foregoing remarks, further and favorable action in the form of a notice of allowance for claims 3, 5, 16, 17, and 18-38 is believed to be next in order, and such action is earnestly solicited.

Please telephone the undersigned at (408) 396-1112 if there are any questions regarding this matter.

Respectfully submitted,



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